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Abstract

This chapter explores the diverse methods used by authors of this book in their research on environment and justice in Australia. It explains the reasoning behind choosing these methods and the perceived advantages and disadvantages of using these methods to study questions of justice. In doing so, it identifies ways in which various qualitative and quantitative methods can be used separately, or in combination, to provide a more comprehensive perspective on justice considerations. The chapter also provides examples of the questions posed to participants in interviews, questionnaires, focus groups and visual studies by authors of this book, to illustrate how researchers have employed and operationalised justice concepts.

Keywords

justice, research, methods, environmental, approaches:, methodology

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Justice approaches: methods and methodology in environmental justice research

Sonia Graham, Claudia Baldwin, Jennifer McKay and Sue Jackson

Summary

This chapter explores the diverse methods used by authors of this book in their research on environment and justice in Australia. It explains the reasoning behind choosing these methods and the perceived advantages and disadvantages of using these methods to study questions of justice. In doing so, it identifies ways in which various qualitative and quantitative methods can be used separately, or in combination, to provide a more comprehensive perspective on justice considerations. The chapter also provides examples of the questions posed to participants in interviews, questionnaires, focus groups and visual studies by authors of this book, to illustrate how researchers have employed and operationalised justice concepts.

Introduction

Researchers who study justice employ a wide array of methods in their efforts to tackle inequalities and injustices in society (Mertens 2007). This is reflected in the 14 methods that underpin the work in this book (Fig. 4.1). The methods used by researchers in this book are so diverse that no single social research methods textbook published to date covers them all. Indeed, some methods, such as network analysis, doctrinal analysis, statutory interpretation, spatial mapping and computer simulations, do not appear in key textbooks used to teach social research methods in Australia (e.g. *Applied Social Research* (Hall 2008), *Social Research* (Sarantakos 2013) or *Social Research Methods* (Bryman 2016)).

The researchers in this book employ a wide range of qualitative and quantitative methods across their portfolios and within particular projects. This enables engagement of the diverse stakeholders listed in Fig. 4.2; the majority of lead authors of chapters¹ in this book engage with at least five of the listed stakeholders in their past and current research. Methodological diversity is seen to be essential to understand the plurality of interests and

1 Each of the 15 lead authors of the 19 chapters of this book were asked to specify what methods they use and what stakeholders they engage with in all their environmental justice research. Throughout the chapter the term 'lead chapter authors' is used to refer to these 15 lead authors.

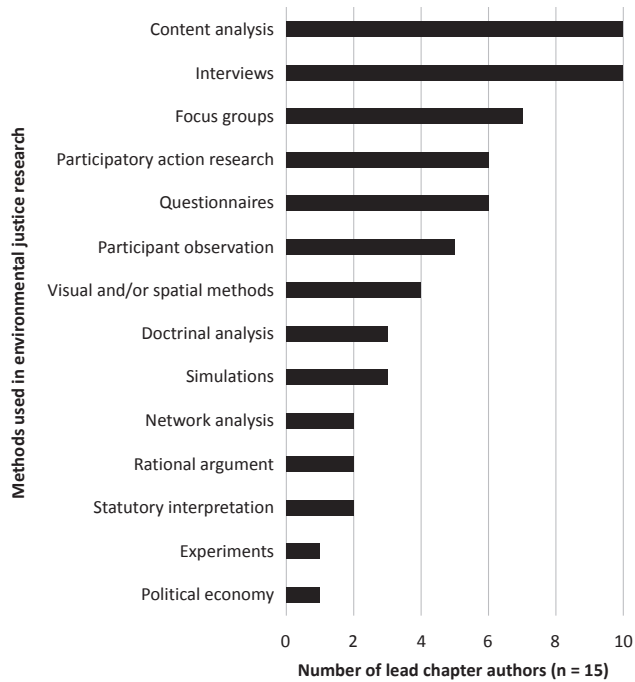


Figure 4.1. Methods used by lead chapter authors in their past and present research on environmental justice.

perspectives involved in natural resource management (Chapter 8), gain descriptive, analytical and normative insight, as well as practical application to improve justice outcomes. The visual and spatial methods also bolster the expression of values in natural resources management by providing non-verbal means to elicit values from respondents (Chapter 11). Ultimately, applied research provides opportunities to involve the public in

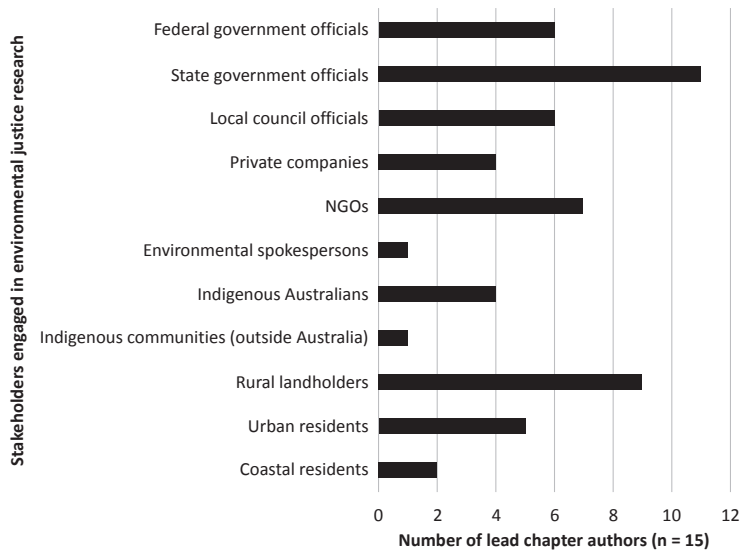


Figure 4.2. Stakeholders engaged in environmental justice research by the lead chapter authors in their past and present research.

dealing with conflict, collaboratively developing and providing input into potential solutions, and influencing decision makers (Chapter 3).

Past reviews of methods and methodological approaches in environmental or justice research have sought to: justify the use of mixed methods approaches (e.g. Mertens 2007, 2013); explore the way in which particular methods are applied, such as multiple criteria analysis (e.g. Romero and Rehman 1987; Mendoza and Martins 2006; Hajkowicz and Collins 2007) or stakeholder analysis (e.g. Reed *et al.* 2009); and evaluate the strengths and weaknesses of various tools (e.g. Lynam *et al.* 2007). The only methodological review that pertained to environmental justice² specifically, sought to evaluate the quality of 42 empirical research studies (Bowen 2000 2002) using 'scientific standards' (Bowen 2002: 3). In Bowen's (2000) critique, qualitative research was not seen to be sufficiently rigorous to be used to inform policy decisions. The overview provided in this chapter strongly challenges such a conclusion; almost all the authors here find qualitative research to be highly appropriate and useful for studying and contributing to environmental justice.

There is a gap in our understanding of what methods are used by researchers who study environmental justice in Australia and internationally, and why these methods are chosen. Thus this book provides an opportunity to begin a broad conversation about the perceived validity of different methods in the context of environmental justice and how such research can contribute to improving processes and outcomes for participants. The chapter outlines the rationale for the methods chosen, and the advantages and disadvantages of each. Examples are provided of the questions posed to participants in interview, questionnaire, focus group and visual studies, to illustrate how justice concepts have been operationalised. Such an exploration can provide insights to researchers, who are new to the field of environmental justice, about the range of methods available, how they have been applied, what methods and questions might be most appropriate for their research, and what refinements may need to be made. Such explanations and justifications can also be used to enhance the ethics and quality of justice research; many of the methods discussed in this chapter require approval from human research ethics committee before their implementation and methodological choices will be evaluated by peers before publication in the academic literature.

Methods used in environmental justice research in Australia

The four main methods used by the lead chapter authors presented here and elsewhere are qualitative, namely: content analysis of documents, interviews, focus groups and participatory action research (Fig. 4.1). Other qualitative methods, such as participatory Geographic Information Systems (GIS) and three-dimensional (3D) visualisation, are more recent additions to the suite, yet are proving to be useful for studying environmental justice, particularly for their ability to enable spatial analysis (Chapter 11; Jackson *et al.* 2012).

Quantitative research methods, such as questionnaires, are occasionally used, but are often used in conjunction with qualitative methods (Chapter 3). This is consistent with other justice research, where mixed methods are often used in sequential and/or iterative stages to understand how stakeholders perceive the issue and decision-making processes, determine how representative these concerns are among the wider population affected, and then present research findings back to participants for comment (e.g. Lauber 1999; Liu 2001; Mertens 2013).

2 See the section on 'Justice and the environment – what are we actually talking about' in Chapter 1 for an explanation of the broad field of research we consider to be described by the term 'environmental justice'.

Table 4.1. Methods used and types of justice studied by lead chapter authors

Methods	Distributive	Procedural	Interactional	Spatial	Temporal
Content analysis	5, 9, 11, 12, 14, 17	5, 9, 11, 12, 14, 17	5, 11, 14, 17	5, 14	5, 14
Interviews	3, 7, 11, 13, 17	7, 8, 11, 13, 17	7, 11, 17	7	7
Workshops	7, 11, 17	7, 11, 17	7, 11, 17	7	7
Participatory action research	3, 13	11, 9, 13			
Participant observation	3, 17	9, 17	17		
Questionnaires	3, 5, 11, 13	5, 11	5, 11		
Visual and spatial	11	11	11	9, 11	11
Doctrinal analysis	6, 9, 12, 16	6, 9, 12, 16	6	12	12
Simulations	13	13			
Statutory interpretation	6, 16	6, 16	6		
Rational argument	10, 15				
Experiments	13, 15	13			
Historical analysis	2				
Political economy	13, 15	13			

Both qualitative and quantitative research methods have been used to explore distributive, procedural and interactional dimensions of fairness in this book (Table 4.1). Only qualitative methods of data collection and analysis – interviews, workshops, content analysis of documents, visual and doctrinal analysis – have been used to investigate spatial and temporal dimensions of fairness by these authors. While this clearly reflects the preferences of the authors, it may also reflect the limited research that exists on these types of fairness in the field of environmental management (Graham *et al.* 2015), and the need for exploratory research to better conceptualise and operationalise these types of fairness.

The numbers in Table 4.1 indicate the chapters of the book that draw on each method. The types of justice referred to in this table are based on the definitions in Graham *et al.* (2015). Note that some authors have focused on principles underlying these broader concepts of justice, such as equity (Chapters 13 and 15), which is usually associated with distributive justice. For a conceptual map of the links between the types of justice, see Chapter 1.

The rest of this section explains how each of the methods are used in the context of environment justice research in Australia. The methods are ordered from the most to least most commonly used (Fig. 4.1).

Content analysis of documents

Content analysis of documents is used by many authors of this book in their qualitative research (Fig. 4.1). Content analysis is useful for understanding environmental justice in Australia because of the wealth of documentary material generated in environmental policy and debates. This includes government reports, non-government reports, community submissions, newspapers, internet blogs and audio-visual material. These materials are often available in the public record and are increasingly available on the internet, but documents can also be accessed from private exchanges between parties.

Access to a broad range of documents produced by many stakeholders allows for insights into how justice is conceived and framed—the different values, notions of justice and perspectives of fairness that shape environmental policy, decisions and responses. Indeed, content analysis of documents enables researchers to understand the positions of a wider range of stakeholders than may be possible using other methods, which is particularly important in justice research. Content analysis is also useful for discovering the justice *intentions* of particular stakeholders, which can then be compared with the *implementation* and *perception* of justice revealed through later documents or other methods. For example, Lukasiewicz *et al.* (2013) used a semi-qualitative content analysis to identify the key justice principles in the Murray–Darling reform process, which was then cross-checked through semi-structured interviews.

Because the documents being analysed inevitably reflect stakeholders' societal attitudes and cultural values, content analysis can be used to illuminate some of the forces that enable or prevent justice questions from coming to the fore in public debates. Thus, analysing documents produced over a time period can provide insights into changes in community and government perspectives on environmental justice. For example, content analysis is useful for understanding how environmental policies have previously treated, and continue to treat, Indigenous rights, and the priority given to Indigenous access compared with other groups (Chapter 9).

Content analysis can be done by deriving categories or themes directly from the text data (open coding). It can start with a theory as guidance for initial coding of text or it can include counting the number of times a theme or keyword appears, accompanied by the interpretation of the underlying context. Because the specific term 'justice' or 'fairness' might be used only rarely, content analysis benefits from researchers deconstructing the concept of justice to effectively explore its components. For example, procedural and interactional fairness concepts, such as transparency and being treated with respect, can be identified through a content analysis that is well informed by theory.

A limitation of solely using content analysis of documents is that material accessible and analysed may be produced for a specific purpose, by specific stakeholders and may fail to incorporate a range of perspectives. Omissions in key documents can, however, point to the deliberate or inadvertent exclusion of marginalised or minority groups (e.g. Indigenous communities) or of particular issues.

Note that the term content analysis is similarly used in analysing interviews and focus groups, usually by systematically coding transcripts. Content analysis differs from discourse analysis, which looks beyond the sentence, keywords and themes to examine the way language is used.

Interviews

Semi-structured interviews allow for a detailed investigation into how justice is understood and implemented by a wide variety of stakeholders (Fig. 4.2). Interviewees' responses do not need to be constrained by existing definitions and conceptualisations of justice – interview questions may indirectly or directly ask about justice and other associated concepts (see questions in Box 4.1). An interview guide allows for consistency among interviews and interviewers, with the flexibility to enable views to be queried in-depth.

Interviewees are more likely to share contentious views with the researcher when discussing the issue one-on-one, compared with group settings. While interviews may allow for a rich understanding of individual perspectives on environmental justice, it may also be difficult to access alternative perspectives if the range of stakeholders is unable or unwilling to be interviewed. Further, interviews do not allow for group learning or deliberation, which is increasingly one of the objectives of participatory research methods in natural resource management (Straton *et al.* 2011).

Box 4.1: Sample of semi-structured interview questions asked in the context of water management in Australia

Business owners perspectives

(Chapter 11, case study 4)

In relation to the January 2011 flood, please review this timeline and indicate on it:

- when you first heard about potential flooding
- what the message was about
- who conveyed the message
- how you received it
- your perception of the information.

Did you assess it to be credible? Why?

What would you have done differently?

Can you suggest any guidelines or procedures for protection of your goods, your site, or for emergency planning?

Government perspectives

(Lukasiewicz 2012)

What are the greatest justice issues in water management today?

What is the guiding philosophy for distributing water? (prompts: equity, equality, self-interest, need (whose?), efficiency, fairness)?

What are the essential criteria for a fair process?

How is the participation of Indigenous people assured? Is this adequate?

How can power relations among stakeholders be managed?

How does your department communicate with its stakeholders? Is it adequate?

(Keremane and McKay 2011)

Please describe a fair process for reducing water use/allocations.

Prior to obtaining approval for a desalinisation project, are there any set of principles/guidelines within which the project proposal is analysed and decided upon? If yes, please explain.

Some ethical challenges may arise while conducting interviews on justice, such as the potential disclosure of illegal activities or personal criticism. Interviewees may also have unreasonable or unattainable expectations about what the researcher can achieve for them and their cause, which can create moral dilemmas for researchers who, as mentioned in Chapter 1, see their justice research as an extension of their moral commitments to justice.

Focus groups and workshops

Focus groups are particularly useful for research into justice in environmental policies and practices. They are also advantageous for researchers interested in the subtle ways in which unequal power relations are structured in group settings and their effect in dominating minority or marginalised positions. For example, the method may bring to light or expose assumptions and practices relating to gender and race.

In a focus group setting, the researcher or facilitator leads a discussion around a small number of specific questions and promotes interaction. For example, Dare (2013) asked focus group participants 'Can you give me an example of how [policy/activity] has impacted on you and/or your community?' As people share and elaborate on their issues,

attitudes, beliefs and norms, and identify reasons behind their views, they provide rich and cumulative data. Dialogue can facilitate self-disclosure and self-validation. A researcher can use such groups to better understand the dynamics between parties and how individuals are influenced by others in a group (Litosseliti 2003). They enable diverse opinions to be voiced, realistic conversations to be had about potential trade-offs of different policy options, and can result in opportunities for individual and social learning.

One of the challenges of focus groups, in environmental justice contexts and beyond, is that stakeholder willingness to contribute ideas may depend on who else is present or be constrained due to confidentiality concerns. Although a skilled moderator or facilitator may help, it is not always possible to ensure that everyone's views are voiced and heard. One remedy is to complement focus groups with individual interviews to minimise potential for groupthink, false consensus or hesitation at sharing deeply held views with others. Such mixed methods can therefore allow for a comparison of how people talk about justice in front of their peers, other stakeholders or decision makers, compared with conversations in private.

Workshops are often used when engaging people with opposing views, policy decision makers or when using particular group-based decision-making tools, such as multiple criteria analysis. Workshops tend to be longer in duration than focus groups and may have larger numbers of participants. For example, the workshop described in Chapter 7 was a full-day event with policy makers from local, regional and state government departments. In comparison, focus groups tend to aim for six to 10 participants, usually from within a similar cohort or belief system (Bryman 2016). Given the larger number of participants and longer duration, workshops are best managed by an independent facilitator.

In both focus groups and workshops, conversations can be derailed by participants who refuse to follow the schedule and seek to promote their own agenda. This is not an insurmountable challenge, but requires deliberate thinking about the purpose of the research and management of stakeholder expectations. Similarly, it is essential that the facilitator does not (intentionally or unintentionally) impose their own view of justice on participants (Stewart *et al.* 2007). In some research contexts, the focus group is not possible or practical so non-invasive methods, such as content analysis, may be preferable.

Participatory action research

Participatory action research (PAR) seeks to go beyond ascertaining views or eliciting values to achieving some degree of procedural justice from within the research process itself. In PAR, participants take an active role in parts or all of the research process, from project design and methods, to facilitation of activities, analysis and evaluation. This approach, which facilitates co-production of knowledge, has gained popularity in environmental justice research as a result of the trend towards decentralised natural resource management governance, giving rise to experimentation in research methods that seek to strengthen citizen engagement in processes that ascertain the views, attitudes and preferences of all affected groups. The strength of PAR is that it fosters inclusivity and empowerment, builds trust in data and crosses the science–practice boundary to make research more useable by stakeholders (Lemos and Morehouse 2005; Vogel *et al.* 2007). The iterative process of creating and 'owning' jointly created data has been found to foster uptake of 'citizen science' or local knowledge (Dilling and Lemos 2011; Jackson *et al.* 2012).

Some participatory methods, such as citizen's juries, introduce evidence or expert opinion to encourage participants to discuss, judiciously argue, deliberate and move towards identifying possible solutions (Delli Carpini 2004; Straton *et al.* 2011). A central aim of these types of effort is to bring about social learning, enhance accountability, reduce

or resolve conflict and contribute in the longer run to deliberative democracy. A requirement for the group concerned to reach consensus on procedures that are conducive to effective and equitable participation and deliberation, as well as criteria for evaluating outcomes, can be demanding. In situations in which stakeholder positions were previously very polarised and based on seemingly fixed attitudes or preferences, researchers report positive improvements to the level of debate and willingness to alter opinions and positions in light of discussion (Proctor and Drechsler 2006). As with workshops and focus groups, skilled facilitation is critical in order to minimise conscious manipulation and for all concerned to be alert to unconscious bias.

Other research methods might benefit from PAR principles, even if PAR is not adopted. Communicating with communities early in a research process can assist in assessing suitability and feasibility of potential case studies as well as methods, and ensure a better uptake of research outcomes. Having skilled researchers or facilitators are a clear advantage in bringing together multiple stakeholders in a working relationship. Similarly, experience can assist in moderating the blurring of the distinction between ‘researcher’ and ‘researched’ (Jackson *et al.* 2012; Mackenzie *et al.* 2012). In addition, many of these principles are consistent with the principles of Indigenous research methodologies (Gibbs 2001; Louis 2007), particularly the expectation that research should ethically draw on Indigenous knowledge and be of benefit to the affected community (Jackson and Douglas 2015), making it suited to justice research that pertains to Indigenous rights or interests.

Questionnaires

Structured quantitative surveys in environmental justice research are often used because they access a larger number of people (through mail, telephone and the internet) than is often possible through qualitative research and can still provide opportunities for respondents to express themselves through open-ended questions (see survey questions in Box 4.2). Surveys allow for generalisations to be made and for relationships to be drawn between perceptions of fairness and the characteristics of respondents (e.g. their social-economic status). The ability to quantify data and apply statistical analyses can make it easier to communicate the results and recommendations to policy makers, because they may perceive quantitative results to be more valid and valuable (e.g. the critique provided by Bowen 2000).

Surveys can be used for different purposes and can enable evaluation of diverse responses to environmental policies, laws and their administration (Box 4.2). In sequential research, surveys can be used in at least two different ways. Surveys can be used early in the research process to identify areas for the focus of future in-depth inquiry. Later in the research process, surveys allow for the ideas generated through qualitative research to be tested and generalised to a broader population.

One of the key disadvantages of surveys for environmental justice research is that respondents might want to elaborate more on some of the issues raised in the survey than in the space allowed. Even if surveys leave space for ‘other comments’, by their nature, surveys predetermine the issues or themes on which views are sought, thereby potentially influencing responses or missing valuable data. This is likely if participants have a different conceptualisation of justice than that which guides the researchers. Researchers will want to be sure that their terms are clearly defined and that as far as possible the meaning of justice concepts is conveyed accurately to avoid misinterpretation. Limitations such as these provide further incentives to employ mixed methods in environmental justice research. For example, a focus group process might generate insight into popular understandings and definitions of key terms or concepts.

Box 4.2: Open-ended and closed questions asked in past questionnaires in the context of water management in Australia

Closed questions

Graham (2002)

Please indicate whether you strongly agree, agree, disagree, strongly disagree or are not sure about the following statements:

- The outcomes of the Environmental Flow Rules are fair.
- The Environmental Flow Rules should allocate less water to wetlands.
- There was adequate consultation of rural communities during the development of Environmental Flow Rules.
- Environmental flows occur too frequently.
- Farmers were adequately consulted about their opinions on the Environmental Flow Rules before they were introduced.

(Chapter 5)

Please indicate your level of agreement with the following statements:

- I trust the decision-making processes in water-related matters.
- The Government's water policies and rules are easy to understand.
- Government pays special attention to different groups such as youth, women, Indigenous groups etc. in water policy design and implementation.

Do you think there is a human right to clean fresh water in urban and rural Australia? (Yes/No/I don't know).

Open-ended questions

What do you see as public interest in urban water supply?

Please name policy areas where independence is least/greatest.

Participant observation

Participant observation is used in environmental justice research to observe how decision making takes place and the ways in which stakeholders are engaged in the process. Thus it is more likely to be used to study procedural and interactional, rather than distributive, fairness. Participant observation is useful for evaluating whether people act in accord with their stated beliefs (e.g. as expressed in interviews). For example, policy makers and community members alike often espouse the importance of treating others with respect (an element of interactional justice); participant observation allows researchers to observe if and how respect is demonstrated.

One of the challenges of participant observation in justice research is that it is not always possible to observe a whole process from start to finish. Policy and planning processes can take place over many years. In addition, social relations are strongly influenced by past experiences, which may have occurred before the research started. This may make it challenging to interpret the quality of relationships among stakeholders. For example, one of the lead authors encountered a government advisory group meeting where people were shouting at one another. While this seemed to indicate a lack of respect among participants, it was later revealed that the situation had previously been more acrimonious, and that this meeting was a significant improvement. For reasons such as this, many of the authors of this book use multiple methods to ensure that they understand justice concerns and their contexts as comprehensively as possible.

Visual and spatial methods

A range of visual and/or spatial methods have been used by lead chapter authors in their resources environment and justice research, such as participatory GIS or geospatial mapping, photovoice and 3D visualisations. They range in varying levels of technical complexity, some requiring specific expertise to establish (3D visualisations), some being easy to use once established (participatory GIS) and others being able to be used by participants with little training (photovoice).

Visual methods are effective in engaging participants in research, exchanging understandable information with (to *and* from) participants, enhancing dialogue for perspectives that are difficult to verbalise or that are emotionally charged, and encouraging cooperation and shared understanding (Keremane and McKay 2011). For example, the construction of a participatory 3D groundwater visualisation tool assisted in building trust between representatives of a regional water allocation committee, scientists and water agency staff (Baldwin *et al.* 2012; Jackson *et al.* 2012). Visualising the groundwater resource was found to be an effective means of bringing water users to the table to ‘see’ the issue more clearly and, with this enhanced transparency, discuss how to reduce the environmental and social impacts of over-allocation.

Photovoice is increasingly used in environmental justice research to empower local residents and to elicit hidden values. It requires participants to take photos that represent their views on certain themes and then discuss them in interviews and/or a focus group to create a common story or shared understanding. In case studies 1 and 2 in Chapter 11, participants are simply asked to ‘take photos that illustrate sustainable use of water from your perspective’. The sharing and discussion of photos taken with such open questions represents ‘participant-generated’ data that minimises researcher bias (Baldwin and Chandler 2010; Baldwin and Ross 2012). The resulting ‘voices’ captured in captions on the photos, or in stories, can be used to inform decision makers of issues and priorities (McKay *et al.* 2010; Keremane *et al.* 2014; Grant *et al.* 2015).

Visual methods are innovative and novel, different from the ‘usual’ methods, and therefore often interesting to, and engaging for, participants (Keremane and McKay 2011). For environmental justice research, they can be an effective option for engaging participants from different ethnic backgrounds who have difficulty expressing themselves verbally (e.g. some people with disabilities) or who are unaccustomed to certain terminology. They are often used in combination with an adapted focus group or workshop format. One of the limitations of visual methods is that they often require significant technological input in their development or application. For example, creating 3D visualisations are time-consuming and require specific skills. Moreover they require interdisciplinary collaboration so that methods, such as possible scenarios or visual stimulus, are designed to ask the appropriate questions. Even simpler methods, such as photovoice, involve logistical complexity in downloading and collecting participants’ digital photos and printing them before the focus group. This can reduce the efficiency or increase the cost of these methods.

Doctrinal analysis

Law has a powerful influence on people and place by regulating the use and access of natural resources by social groups. Doctrinal research asks what the law is in a particular area and uses primary sources – cases, legislation, policy documents and other historical materials – to systematically describe and critique a body of law and how it applies. It seeks

to understand the interactions between legal rules, highlight problems in the legal framework and may also make suggestions for law reform, taking into account likely social, economic and environmental transformations in society (e.g. McKay 2010).

Environmental justice researchers use doctrinal analysis to interrogate interactions between law and natural resources or the environment as they are revealed in legal determinations. Legal pronouncements make or amend the rules that are intended to regulate human behaviour (Bartel *et al.* 2013; McKay 2015) and so can serve as a window to the powerful societal presumptions, norms, ideologies and socio-spatial processes that produce uneven outcomes in environmental disputes or contests. The explicit attention given to concepts such as procedural fairness and equity in legalistic interpretations makes assessing justice claims within a court case easier to navigate and focus on. Furthermore, doctrinal analysis studies can elucidate several conflict resolution measures (McKay 2011).

Beyond focusing specifically on the law and its implications, doctrinal analysis is useful because litigation can highlight broader aspects of the community debate (see Chapter 12 for an example in the context of coal seam gas and Chapter 16 for an example in relation to water allocation plans). The material required is publicly accessible and are often commented on extensively in the media before and after legal proceedings have concluded.

One of the disadvantages of using doctrinal analysis is that it requires an existing body of statutes, court cases and societal debates on the issue of interest. Where the state of the law is in its infancy, statutory interpretation may be more useful (McKay 2008). Another disadvantage of using doctrinal analysis in justice research is that analysis of the law need not reveal all justice matters pertaining to a court case (Chapter 16). This means that narrowing in on legal interpretations of justice may provide only a partial understanding of the justice concerns that relate to a particular law. Thus doctrinal analysis can be complemented by other methods, such as interviews, that provide insights into perceptions on the implementation of laws. Such multi-method evaluations of the operational aspects of laws are common in sociolegal studies, but they have a limited focus on environmental justice. There is much scope here for further research.

In a settler society such as Australia, where an Indigenous minority has maintained a parallel customary legal system in spite of colonial legal institutions, it is important for researchers to reflect on the capacity of the former colonial legal system to recognise Indigenous concepts that are considered essential to social justice, namely sovereignty and Indigenous systems of property (Strelein and Tran 2013). The doctrines, precepts and norms held by Indigenous or other minority communities can also be a valuable source of information for environmental justice scholarship. These are often documented in court cases, such as *Mabo* (*Mabo v Queensland (No. 2)* ('Mabo case') [1992] HCA 23; (1992) 175 CLR 1) and subsequent cases such as *Wik* (*Wik Peoples v Queensland* ('Pastoral Leases case') [1996] HCA 40 (1996) 187 CLR 1), and the plethora of other decisions that reveal the content of particular Indigenous doctrines and norms. These cases also show how these Indigenous notions are articulated and represented in a court environment that follows the standards and traditions of the dominant society.

Simulations

Computer simulations of the real-world implications of policies can be quantitative (e.g. Powersim, Vensim and APSIM) or qualitative (e.g. STELLA). They can be used to help affected stakeholders understand the distribution of impacts for themselves, others and

the environment. They can also be used to help stakeholders propose alternative distributive outcomes, if they have the opportunity to investigate alternative scenarios or challenge the way the decision rules are being implemented in computer models (Graham 2009). By providing stakeholders with a greater understanding of the implications of decisions, computer simulations and modelling of scenarios can help to tackle power imbalances in decision-making processes that result from decision makers having a greater access to knowledge. As such, they can be used to help communities and policy makers identify the 'fairest' policy or decisions in situations where different stakeholders hold conflicting views on justice (Chapter 15).

Use of experts in participatory modelling in collaboration with the community can increase credibility in options, establish shared meaning and co-generate new knowledge (Henriksen and Barlebo 2008; Hoverman *et al.* 2011). In this way, computer simulations can form part of PAR and facilitate fairer procedural and interactional fairness in practice. Bringing in external expertise needs to be handled sensitively, to ensure experts are seen as credible – whether local or brought in from outside the research setting – and by selecting appropriate persons based not only on their expertise, but their personal qualities and experience in dealing with stakeholders (Mackenzie *et al.* 2012).

A more traditional application of computer simulations involves exploring or mapping out the various options available and comparing the outcomes of each. A notable example is given by Cazorla and Toman (2000), who compare the impacts across countries of different burden-sharing rules for greenhouse gas emission reductions, with each rule implementing a different equity principle. Sensitivity analyses of simulations are used to identify the critical factors that make a difference, as well as conflicts that make no difference to the final outcome (see Chapter 13 for an example).

Network analysis

There has only been limited use of network analysis in environmental justice research in Australia – much of its full potential is yet to be explored. Network analysis is useful for understanding the relational (procedural and interactional) dimensions of justice because it facilitates the exploration of social dynamics and relationships in communities and organisations. Knowing about the quality and nature of social relations allows the researcher to track and unfold the processes of how voice is exercised and how the characteristics of interpersonal relationships affects decision-making processes and outcomes. A refined analysis of existing networks provides insights into who is able to voice their concerns about emerging environmental policies and other relevant decisions, argue for their needs to be accommodated, and thus negotiate and access benefits. This can be particularly important in communities and contexts where decisions are made informally.

To date, network analysis has primarily been used as a qualitative method in environmental justice research in Australia. There is much potential for it also to be used quantitatively, using programs such as UCINET.³ Such programs can be used to explore the similarities between and relative strengths of social relations (Borgatti *et al.* 2013).

Rational argument and conceptual analysis

Conceptual analysis and rational argument are the standard tools used by philosophers working in the so-called analytic tradition. Roughly speaking, in the analytic tradition,

3 See <<https://sites.google.com/site/ucinetsoftware/home>>.

philosophy, as a discipline, is akin to science – its primary aim is to produce knowledge and help people understand the world. Just like scientists draw conclusions on the basis of empirical evidence, philosophers likewise draw conclusions after examining evidence. For philosophers, however, the evidence takes the form of premises purportedly supporting the conclusion of an argument. It is the task of the philosopher to ask whether the relationship of support between premises and conclusion is strong enough to support the claim being made.

As well as evaluating arguments, philosophers also construct them. Just as a scientist undertakes research with the aim of testing a hypothesis, a philosopher presents an argument for the purposes of defending or undermining a position. In theory, the philosopher is meant to be as impartial and as committed to the ‘experimental’ method as a scientist. It is basic practice for a philosopher to test the adequacy of their argument by considering objections to their position. The rationale is that the more objections a philosopher can identify and satisfactorily answer, the stronger their argument becomes. For the philosopher, this process of ‘objection and replies’ serves to sharpen the argument; just as focusing a microscope serves to bring a scientist’s laboratory research findings into view.

One of the advantages of rational argument is that it helps to clarify and, therefore, render transparent, rival positions in a debate. It can also help to reframe orthodox conceptualisations. Debate about environmental justice, in theory and practice, can be emotionally charged: theorists, no less than activists, may allow their personal convictions to inform their arguments. While every researcher needs to be cognisant of their potential biases, it is the philosopher’s job to distinguish between claims that support a particular position or theory, and claims that serve only to ‘muddy the waters’.

Conceptual analysis likewise helps to bring clarity to a debate. Concepts such as ‘justice’ and ‘fairness’ can mean different things to different stakeholders. The concern is that without getting clear about the concepts in question, people will be simply ‘talking past one another’. The aim of conceptual analysis is to clarify the terms that feature in the premises of arguments. Roughly speaking, conceptual analysis can be understood as a method of establishing credible definitions or authoritative analyses. It is purportedly useful as an aid to projects that involve identification or categorisation. For example, Hadley (Chapter 10) employs specific analyses of concepts such as ‘property’, ‘ownership’, ‘justice’, ‘interests’, and ‘rights’. A presupposition of his project is that, based upon conceptual analysis of the relevant concepts, it is logically meaningful to, first, consider animals as property owners and, second, to consider animal property rights as a suitable topic for justice research.

A limitation of both rational argument and conceptual analysis is that such methods impose constraints upon debate and, in the process, may foreclose potentially useful lines of enquiry. Some stakeholders may need to make their claims in ‘non-rational’ ways (e.g. story-telling, humour or activism), and it might be good if some concepts resist precise definition.

Statutory interpretation

Statutory interpretation has become increasingly important in legal environmental justice research over the last decade. There are many statutes covering environmental management, and many of those impose very broad objectives on all stakeholders, including landholders, industry and governments. Parliaments not only develop and enact statutes but also contribute to interpretive processes: legislative provisions now direct

courts, tribunals and others as to how to go about interpreting statutes and delegated legislation. Therefore, where once the interpretation of judicial pronouncements and the common law were considered of paramount importance to proper legal practice, today practitioners must also be able to properly read and interpret the myriad of statutory instruments that dominate the legal landscape. As Justice Kirby (2003: 95) aptly notes:

the construction of statutes is now, probably, the single most important aspect of legal and judicial work. In Australia, courts have discovered that many lawyers intensely dislike this feature of their lives. They find the obligation to read Acts of Parliament, from beginning to end, so distasteful that they will do almost anything to postpone the labour. The High Court of Australia has been moved to protest at this unwillingness to grapple with the words of the statutory text, instead of returning to the much loved words of judges, written long ago and far away, who uttered them before the legislature's text became the law. Whilst this tribute to the judiciary is touching, it does not represent the law. The world of common law principle is in retreat. It now circles in the orbit of statute. Where statute speaks—and particularly a curious statute such as a Constitution or a Human Rights Act—there is no escaping the duty to give meaning to its words. That is what I, and every other judge in the countries of the world that observe the rule of law, spend most of our time doing.

Compared with doctrinal analysis, statutory interpretation focuses on the legislative outputs of parliament as they currently stand. Statutory interpretation involves deliberating over the intent of parliamentarians where words in statutes are not obvious and clear, based on their ordinary meaning. This may involve using extrinsic documents, such as parliamentary speeches on a bill or law reform reports to help understand parliament's intent for a piece of legislation. For the justice researcher, statutory interpretation can assist in understanding the factors that influenced a statute's enactment, appeal and/or repeal. An advantage of using statutory interpretation is that it can be used before the first court challenge to a provision of an Act is undertaken, when there is a lack of judicial conclusions for doctrinal analysis.

Experiments

The main disciplines that use controlled (laboratory), partially controlled and field experiments in environmental justice research are behavioural economics and social psychology. The advantage of laboratory experiments involving human participants is that they offer control. They require the researcher to start by developing specific hypotheses as to what factors might influence an individual's or a group's relationship with some aspect of justice. Once the hypotheses are developed, the researcher can systematically control for those factors and study whether, and under what conditions, the hypothesised effects occur (see Chapter 15 for an example).

The disadvantage of laboratory experiments is that they involve decontextualisation: factors are held constant that are not constant outside of the laboratory environment. Field experiments offer one solution to this limitation. Although field experiments allow for less control, they allow for the study of contextual factors not accessible in the laboratory. For example, a field experiment can more easily account for past experience, failures and successes, trust, and expectations about the future.

The use of at least partially controlled experiments holds great potential for a better understanding of the factors underpinning approaches to justice 'in action' – a potential that

environmental justice researchers are only beginning to become aware of. In environmental justice research, different kinds of experiments can complement one another, as well as complement non-experimental approaches, such as the other methods discussed in this chapter.

Political economy research

Political economy research lends itself to the study of environmental justice because it involves exploring conflicts of values in decision making, particularly conflicts between social equity and economic efficiency (Chapter 13). The political economy approach embeds justice research, and considerations of justice, within a broader framework that takes account of social and political realities. These typically include the prevalence of budgetary constraints or the need to compromise with potentially conflicting goals, be they geostrategic and military, dealing with pervasive corruption or with strong opposing forces, and existing property rights regimes. As Chapter 15 illustrates, the social reality of conflicting values around justice can create the greatest obstacles to achieving justice. The ‘economy’ in political economy usually brings into the picture the existence of scarcity of some kind – of resources, but also, and sometimes more importantly, scarcity of time, knowledge, trust or self-confidence. The political economy of justice emphasises the importance of context, which, when very constraining, can sometimes challenge the results of other approaches. Thus political economy research can be usefully applied in environmental justice research in conjunction with other qualitative and quantitative methods.

Conclusions

Justice research is at its best when it reveals and explains the diverse values, interests and perspectives of those who make, and are affected by, decisions. It is for this reason that many of the authors of this book use multiple methods to understand how various stakeholders relate to the environment and believe that justice can be achieved. Quantitative methods provide a broad indication of a sample population’s norms about justice, which may be of benefit to decision makers who wish to represent, take into account or even shape broad community sentiment. Qualitative methods, on the other hand, provide an opportunity to explore the ‘why’, the underlying values and interests that shape community views. Furthermore, qualitative methods can be particularly useful for understanding the views of those language challenges or cultural sensitivities. Because of the logistical necessity of smaller sample population sizes for qualitative research, the results can provide insight to the views of both powerful stakeholders and marginalised groups. Like quantitative methods, this too can assist in decision making. Several of the researchers in this book used mixed methods in a sequential manner. The generation of data from one method may be contingent on analysis of data from another method. Mixed methods also can be used to complement each other to build a composite picture of environmental justice components and/or to validate data gathered through other methods. To date, though, there has been little analysis of the appropriateness of using different methods separately or in conjunction for such research.

The variety of methods used in environmental justice research reflects the diversity of disciplinary backgrounds of contributing scholars. The methods reflect that applying social justice to environmental justice necessitates a crossing of disciplinary boundaries. For example, to evaluate distributive justice effectively, researchers will benefit from an

understanding of both physical and social science; that is, not relying solely on perspectives of impacted or benefited stakeholders, but also accessing independent expert views and scientific reports. To understand and influence procedural justice, researchers will benefit from legal, institutional and social science expertise. Interview and document analysis methods will no doubt remain core to in-depth understanding of environmental justice. Just as visual and simulation or modelling methods can play a stronger role, so too can analysis of social media through content analysis and other innovative techniques. This supports an argument for both interdisciplinary teams of researchers and individual researchers being skilled in use of different methods.

Justice is a normative concept and justice research can be value-laden. Researchers need to be aware of this and reflect on the role they play as they apply their methods. Ultimately, fair environmental justice research relies on researchers being competent, rigorous and systematic in research design and analysis. This chapter contributes to one of the aims of this book: to nurture, improve and progress environmental justice research. The chapter represents the beginning of a conversation about the purpose, advantages, limitations and application of different methods for research about environmental justice.

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